



A.D. 1872, 10th OCTOBER. N° 2991.

Drying Sewage.

LETTERS PATENT to William Astrop, of 27, Oriel Road, Homerton, in the County of Middlesex, Paper Maker, for the Invention of "IMPROVED MEANS AND APPARATUS FOR DRYING SEWAGE AND OTHER LIKE SUBSTANCES."

Sealed the 4th April 1873, and dated the 10th October 1872.

PROVISIONAL SPECIFICATION left by the said William Astrop at the Office of the Commissioners of Patents, with his Petition, on the 10th October 1872.

I, WILLIAM ASTROP, of 27, Oriel Road, Homerton, in the County of Middlesex, Paper Maker, do hereby declare the nature of the said Invention for "IMPROVED MEANS AND APPARATUS FOR DRYING SEWAGE AND OTHER LIKE SUBSTANCES," to be as follows :—

My Invention relates especially to the separation from the liquid and the drying of the solid parts of sewage, but is also applicable to the separation of other solids from the liquids from which they may be associated.

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When practicable I cause the solid part of the sewage to be precipitated and as much of the liquid drawn therefrom as possible, and I prefer to employ for that purpose the well-known means of settling tanks or reservoirs provided with false bottoms or gratings covered with wire gauze and felt, a partial vacuum being formed beneath the said 5 false bottoms by any suitable means. I then complete the drying of the drained precipitate by means of a centrifugal machine provided with the following apparatus:—I employ in the said centrifugal machine one or more blades or scrapers, adjusted by preference at an oblique angle with and set near to the circumference, so as to agitate as the machine 10 revolves the matter under treatment, close to the internal surface of the cage, thus preventing the concretion or felting of the solid substance on the wire gauze or other draining surface employed. The said blades or scrapers may be either fixed or moveable, or arranged to revolve with the cage of the centrifugal machine at a slightly less speed by suitable 15 gearing or other mechanical means.

I also employ a rotating brush or brushes in connection with the centrifugal machine, so arranged and driven that the bristles of the brush or brushes shall be pressed into or through the meshes and clear them of any substance that may choke them. The brush or brushes 20 may be applied to or withdrawn from the gauze at pleasure.

If preferred, the clearing brush may be made to reciprocate against the gauze instead of to rotate.

I also apply in combination with either or both of the above-mentioned improvements, felt, cloth, or other suitable permeable material 25 to the internal surface of the wire gauze of the centrifugal machine, whereby I still further avoid the rapid choking effect which takes place when wire gauze only is used.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said William Astrop in the Great Seal Patent Office 30 on the 10th April 1873.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM ASTROP, of 27, Oriel Road, in the Parish of Homerton, in the County of Middlesex, Paper Maker, send greeting.

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WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Tenth day of October, in the year of our Lord One thousand eight hundred and seventy-two, in the thirty-sixth year of Her reign, did, for Herself, Her heirs and successors,
5 give and grant unto me, the said William Astrop, Her special licence that I, the said William Astrop, my executors, administrators, and assigns, or such others as I, the said William Astrop, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein
10 expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for “**IMPROVED MEANS AND APPARATUS FOR DRYING SEWAGE, AND OTHER LIKE SUBSTANCES,**” upon the condition (amongst others) that I, the said William Astrop, my executors or administrators,
15 trators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said
20 Letters Patent.

NOW KNOW YE, that I, the said William Astrop, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the accompanying Drawing,
25 and to the figures and letters marked thereon, that is to say:—

My Invention relates especially to the separation from the liquid and the drying of the solid parts of sewage, but is also applicable to the separation of other solids from the liquids with which they may be associated.

30 When practicable I cause the solid part of the sewage to be precipitated and as much of the liquid drawn therefrom as possible, and I prefer to employ for that purpose the well-known means of settling tanks or reservoirs provided with false bottoms or gratings covered with wire gauze and felt, a partial vacuum being formed beneath the said
35 false bottom by any suitable means. I then complete the drying of the drained precipitate by means of a centrifugal machine provided with the following apparatus:—I employ in the said centrifugal machine one or

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more blades or scrapers, adjusted by preference at an oblique angle with and set near to the circumference, so as to agitate as the machine revolves the matter under treatment, close to the internal surface of the cage, thus preventing the concretion or felting of the solid substance on the wire gauze or other draining surface employed. The said blades 5 or scrapers may be either fixed or moveable, or arranged to revolve with the cage of the centrifugal machine at a slightly different speed by suitable gearing or other mechanical means.

I also employ a rotating brush or brushes in connection with the centrifugal machine, so arranged and driven as to clear the gauze or 10 other draining surface employed of any substance that may tend to choke it. The brush or brushes may be arranged so as to be applied to or withdrawn from the draining surface at pleasure.

If preferred the clearing brush may be made to reciprocate against the gauze instead of to rotate. 15

I also apply in combination with either or both of the above-mentioned improvements, felt, cloth, or other suitable permeable material to the internal surface of the wire gauze of the centrifugal machine, whereby I still further avoid the rapid choking effect which takes place when wire gauze only is used. 20

In the Drawing, Figure 1 represents an elevation of a centrifugal drying machine with my improvements applied thereto; Figure 2 a vertical section, and Figure 3 a half plan and horizontal section of the same. Like letters of reference refer to like parts in each of the Figures. 25

A is the drum or cage of a centrifugal machine, of which I prefer the axis B to be vertical and supported at its lower end by the footstep C on the bed plate D, and at its upper end by the headstock E, which is connected to the bed plate by the columns F, F. A strap pulley G is fixed upon the upper end of the axis B for turning the drum or cage A. 30 On the axis B, and inside the drum or cage A, is placed loosely, so as to turn independantly of the said axis B, the sleeve H of a frame I. To this frame are fixed the blades or scrapers J, J, set at an oblique angle to and nearly in contact with the internal surface of the drum or cage. On the upper end of the sleeve H there is keyed the strap 35 pulley K, by means of which the frame I has imparted to it a motion round the axis B in the same direction as the drum or cage A itself;

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but the relative speeds of revolution of the drum or cage A and of the frame I is so regulated by properly proportioning the sizes of the pullies G and K to each other, or otherwise, that the drum or cage A shall revolve at a speed somewhat different from that of the frame I, by
5 which means the blades or scrapers J, J, are gradually carried round the internal circumferential surface of the drum or cage, so as to agitate the matter under treatment and deflect it from the gauze or felt as it becomes dry, making way for the wetter portions to be driven outwards against the gauze or felt by the centrifugal force as the machine revolves.
10 The blades or scrapers J, J, are set in a reverse direction to enable the machine to work equally well when revolving in either direction; but instead of using both blades, I sometimes remove one and fix in the place thereof a wire brush L, shown in dotted lines, arranged to sweep the internal surface of the gauze or felt so as to keep it free from
15 coagulated, concreted, or felted deposit, which, if allowed to remain thereon, rapidly hardens and renders the gauze or felt inoperative in removing the remaining moisture from the matter under treatment.

The blades or scrapers J, J, and the brush L may be fixed in position instead of revolving, but greater power is then required to drive the
20 machine in consequence of the resistance they offer when the matter under treatment becomes stiff or agglutinated. By the arrangement of differential speeds above described, power is economized whilst the blades and brush are allowed to operate sufficiently. Or the blades, or blade and brush may, if preferred, be so arranged, mounted, and operated
25 that it or they may be put into or thrown out of action at pleasure. Any desired number of frames and corresponding blades or brushes may be connected to the sleeve H and operated with it. Any suitable gearing may be employed to drive the drum or cage A, and the frame I, instead of straps and pullies, as shown.

30 When employing the centrifugal machine for drying sewage or other like substances, I sometimes apply felt, cloth, or other suitable permeable material M to the internal surface of the wire gauze N, and by preference I apply a second but coarser wire gauze O to retain the felt or other permeable material in position, and to prevent the blades from
35 coming in contact with and injuring the said felt or other material, the whole being securely fastened to the cage by the frames P, which are screwed or otherwise fixed thereto.

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I have herein-before stated that I prefer to precipitate the solid matter of sewage before placing it in the centrifugal machine by means of settling tanks with false bottoms, beneath which a partial vacuum is formed, but I find that this is not always necessary, as sewage sludge containing a large per-centage of water may in some cases be run direct 5 into a centrifugal machine fitted with my improvements, and be both drained and dried therein.

Having now described the nature of my said Invention, and the manner in which the same is to or may be performed, I would have it understood that what I claim as my Invention is,— 10

Firstly. The application and use in connection with centrifugal drying machines of the blade or scraper, or blades or scrapers, adapted, arranged, and by preference operated substantially as described and illustrated, and for the purpose herein-before set forth.

Secondly. The application and use in centrifugal drying machines 15 employed for drying sewage or other like substances, of a brush or brushes arranged, adapted, and operated, substantially as described and illustrated, and for the purpose herein-before set forth.

Thirdly. The use in centrifugal drying machines employed for drying sewage or other like substances of felt, cloth, or other suitable permeable 20 material interposed between the outer wire gauze and the material under treatment, with or without the internal wire gauze O, substantially as described and illustrated, and for the purpose herein-before set forth.

In witness whereof, I, the said William Astrop, have hereunto set my hand and seal, this Ninth day of April, in the year of 25 our Lord One thousand eight hundred and seventy-three.

WILLIAM ASTROP. (L.S.)

Witness,

W. H. BECK,

139, Cannon Street, E.C.,

Agent for Patentee.

30

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1873.

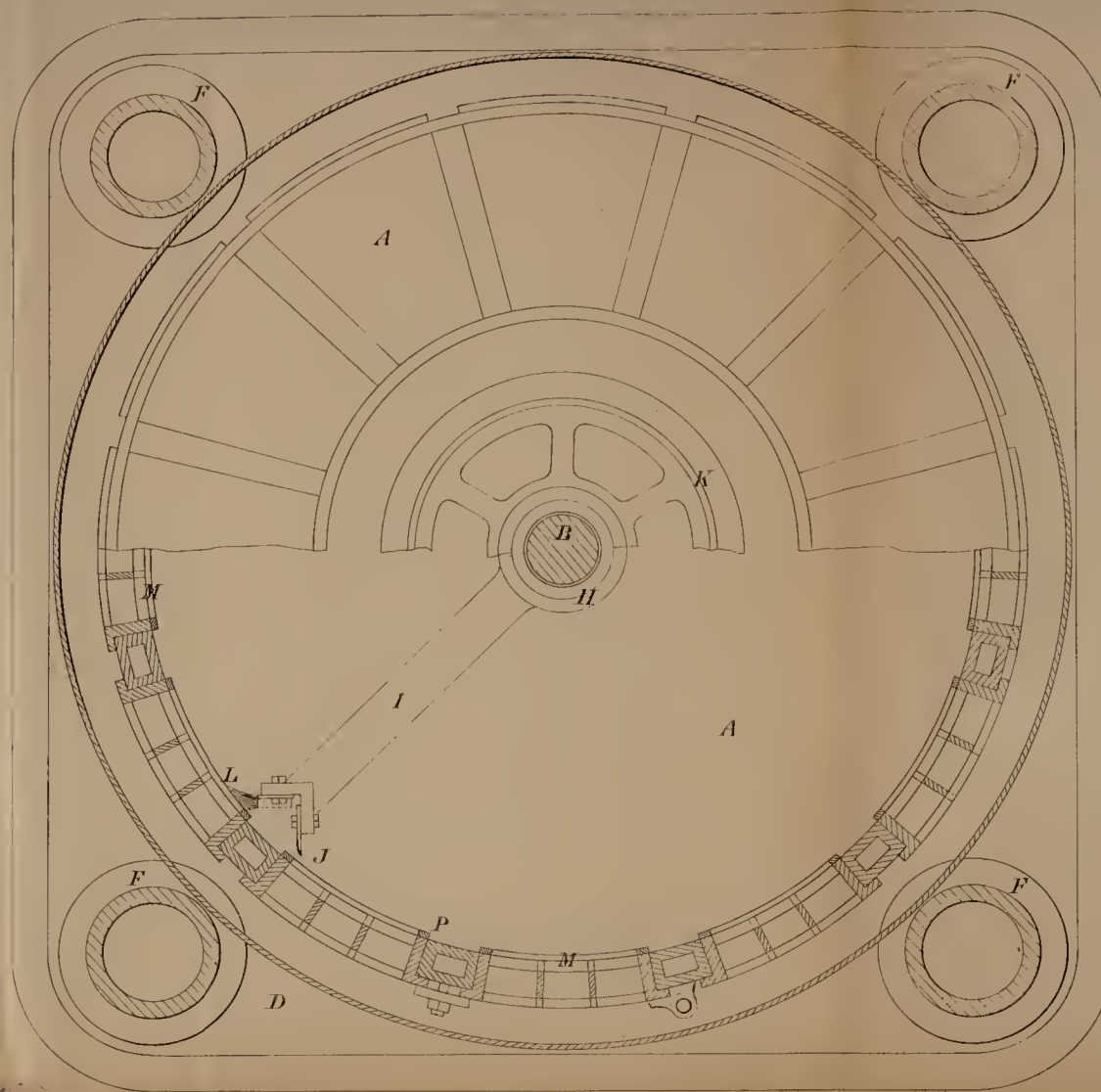


FIG. 3.



FIG. 1.

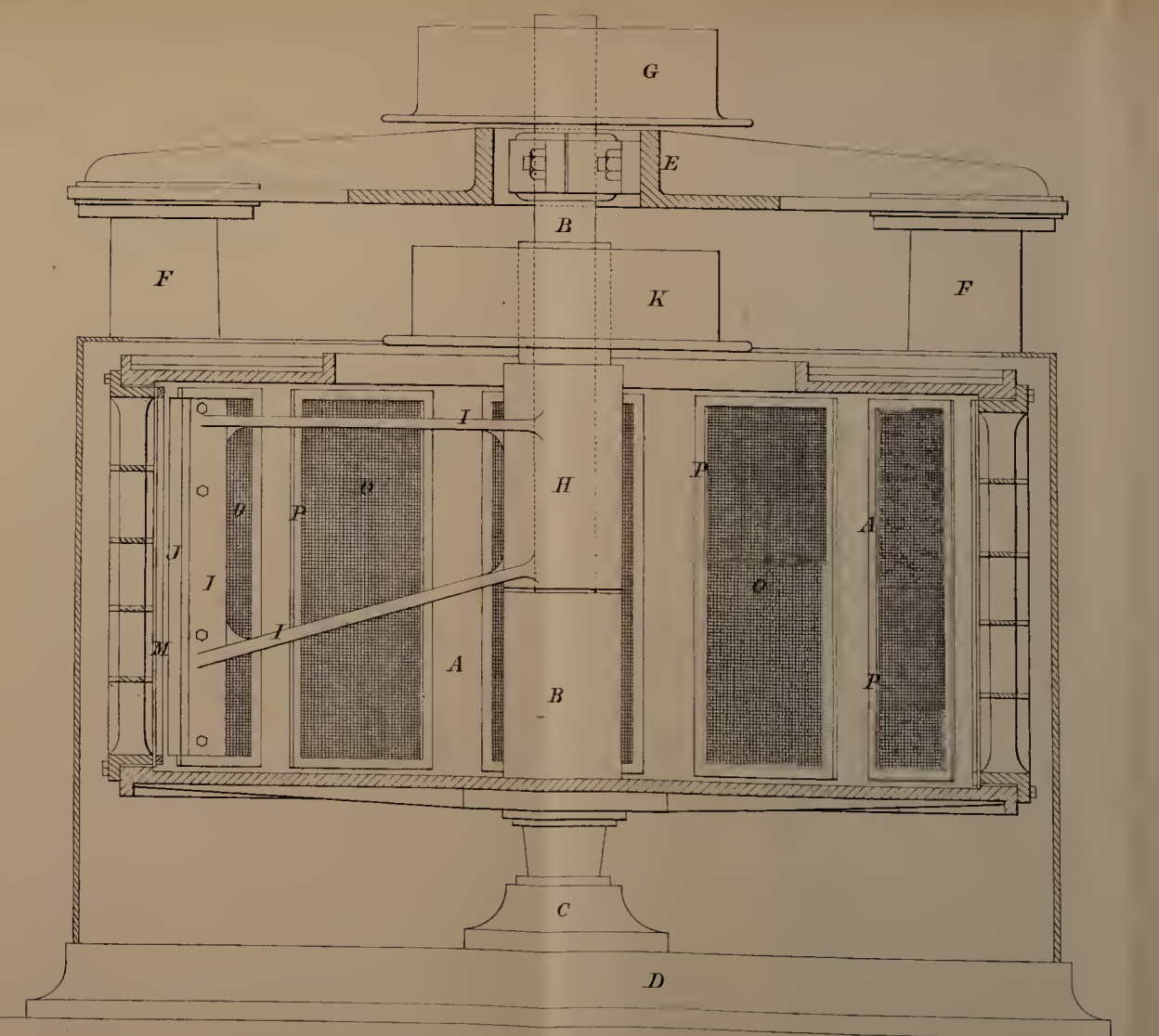


FIG. 2.

